Do Not Print This Page.

- Load 1 sheet of cardstock paper.
- Print Page 2 - the cover
- For the body of the text, load 3 sheets of 28lb matte finish paper into the printer.
- Print pages 3, 5, 7 (Sheet 1, 2, 3)
- Load page 7 (The third text body sheet printed) in the printer face up, and print page 8.
- Load page 5 (The second text body sheet printed) in the printer face up, and print page 6.
- Load page 3 (The first text body sheet printed) in the printer face up, and print page 4.

  Organize the pages in order so that the cover is on the bottom facing down, with pages 6 and 7 facing up. Reverse the pile and staple together in the center.

REV 080801: Changed factory default sample time to 15 seconds from 10 seconds. Added line/filter/needle assy to page 1. Changed O2 sensor P/N to 001140. Changed title to simplify product.

REV 090129: Cleaned up printing instructions to put them in the right order for individual page backside printing. Re-arranged spare parts and accessory items to change septa to 1/16th thick version, include 001370 sample line and 001364 high capacity battery pack option, and change charger to 001363.
Added comment that the analyzer is intended to operate off its internal battery pack – and that a high capacity battery was available.

REV 090821: Changed Power supply accessory to 001400. Changed title of 001246. Added line in specifications table to note 16 hour battery option. Removed Wash Down Note due to socket in front panel.

CO2 / O2 MAP Gas Analyzer

Model 900141

User Manual

BRIDGE
analyzers, inc.

Bridge Analyzers
1805-B Clement Avenue
Alameda, CA 94501
USA
(510) 337-1605 (voice)
(510) 337-0388 (FAX)
www.bridgeanalyzers.com

P/N 001283 Rev 090821

BRIDGE
analyzers, inc.

Technical Support, Warranty and Service

Technical Support:

Unlimited no-charge technical support is available from Bridge Analyzers, Inc. at the telephone numbers and email address below. Please feel free to make use of this service in case you have any questions.

Warranty Service Policy:

Your ***BRIDGE GAS ANALYZER*** is covered by a one-year parts / workmanship warranty.

In order to return the analyzer for service, please contact Bridge Analyzers for detailed instructions at:

Bridge Analyzers, Inc.
1805-B Clement Ave., Bldg. 28
Alameda, CA 94501 USA

(510) 337-1605 (voice)
(510) 337-0388 (FAX)

email: support@bridgeanalyzers.com

For product returned under warranty, the customer pays freight charges for product return. Bridge will repair or replace the analyzer and return the analyzer freight prepaid to the customer by the same shipping class used to ship the analyzer to Bridge. There will be no charge for parts, labor, or outbound freight for products serviced under warranty.

Non-Warranty Service Policy:

For product no longer under warranty or for malfunctions not warrantable, the customer pays freight charges for product return.

Bridge will evaluate the unit and respond to the shipper with a service estimate for repairs, recommended upgrades and additionally requested parts. Once the service estimate is reviewed and the work authorized by the customer, Bridge will proceed with the service authorized.

Customers who do not have a 30 day terms account established with Bridge may choose to have service charges paid by COD or Major Credit Card, or establish a 30 day terms account (which requires credit verification and takes approximately 10 working days to approve).

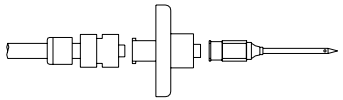
Bridge will return the analyzer to the customer by the same shipping method used to return the analyzer to Bridge unless advised of a different shipping class by the customer. (Shipments from Bridge Analyzers are by UPS Ground Service normally, but other UPS shipping methods may be selected by the customer.
The customer will be charged for service and upgrade parts, labor, and outbound freight for products not under warranty.

CO2 / O2 MAP Gas Analyzer

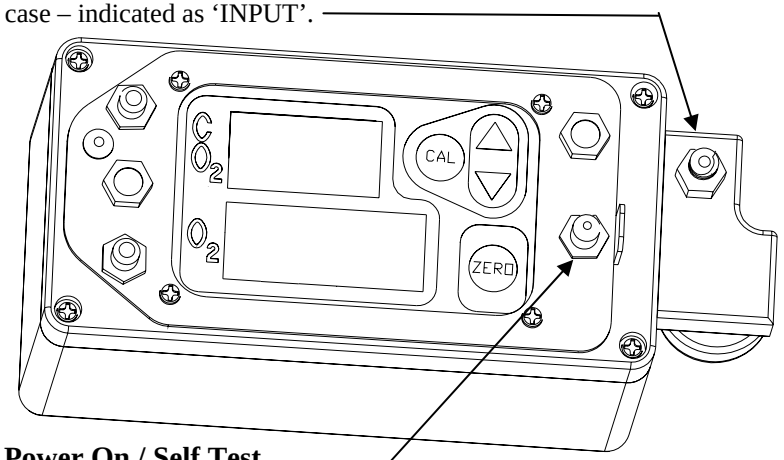
Model 900141

Operating Instructions

1. Initial set-up.



Install the 25 MM Dia white sample filter and sample needle to one end of the black sample line. Install the other end to the gas input port Luer Lock fitting on the intake manifold at the upper-right side of the analyzer case – indicated as 'INPUT'.



2. Power On / Self Test

Depress the white Power Switch, located on the top-right side of the analyzer, to turn power on to the unit. (This is a 2-Action push button switch with a white protective rubber sealing boot. The first activation turns power ON, the second activation turns power OFF.)

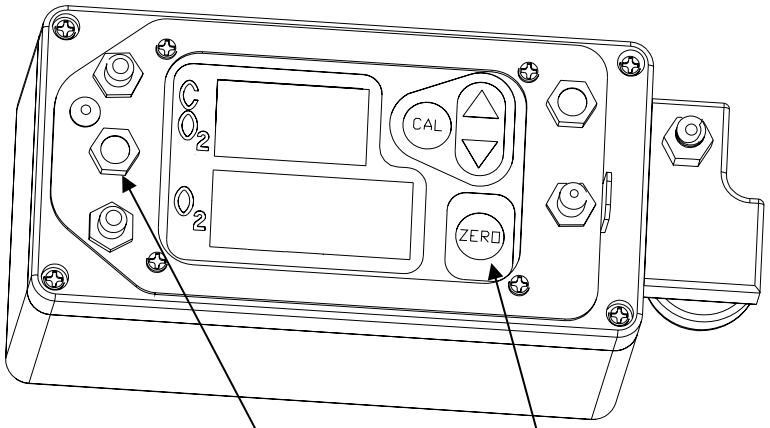
The analyzer will perform a self test, indicated by temporarily lighting all display elements with 8's and running the pump. At the end of the self test, the pump will be off and the display will show dashes, indicating successful completion of self-test and awaiting operation.

Operation begins when the operator initiates the first Zero.

A note about Zeroing the Analyzer

The most important thing to remember is that the accuracy of the analyzer is assured by periodically "Zero-ing" the analyzer on ambient air. When the analyzer is zeroed, the CO2 measurement channel is set to zero, and the oxygen channel is calibrated to ambient O2 = 20.6%.

The automatic Zero function may be performed at any time by simply pressing the ZERO button for ½ second.



Note:

For residual oxygen applications, the sample needle does not have to be removed from the product package during the Zero procedure. The analyzer automatically switches to a separate Zero port at the top-left side of the case for drawing in ambient air for the room air Zero process. For High Oxygen applications, room air preconditioning may be required before the Zero is activated.

3. First Zero after Power-Up

Initiate the first Zero after power up by pressing the ZERO button on the display panel for one second. The pump will start, the display will flash dashes, and the Zero will begin. The CO2 Zero / O2 Cal is fully automatic and takes approximately 30 seconds to complete.

At the end of the Zero sequence, the analyzer will show gas readings and the pump will remain on – the analyzer is in continuous sample and measure mode. (The operator may note the CO2 display counting down to "0.00" as an indication of the readiness of the analyzer.)

3.1 Periodic Zero Requests – 5 minutes and 30 minute intervals.

At 5 minutes from power on and every 30 minutes thereafter, the analyzer will alternate gas readings with dashes. This is the "Zero Request" indication. The operator should Zero the analyzer when convenient after the dashes appear. (The analyzer continues to measure gas during the Zero Requests.)

3.2 Oxygen Sensor Test

The electro-chemical Oxygen sensor gradually degrades loses sensitivity over 12-18 months. As part of the analyzer 'Zero' routine, the analyzer measures the oxygen detector voltage output when calibrating it with ambient air. If a low output cell is detected, the analyzer will display '**Lo**' on the oxygen display as an indication that the O2 sensor should be replaced soon.. This warning may be cleared by pushing any button on the front panel.

Model 900141 CO2/O2 Map Headspace Gas Analyzer Specifications

Gases Measured:	Carbon Dioxide (CO2), and Oxygen (O2)
Measurement Method:	CO2: NDIR (Non-Dispersive InfraRed.) Oxygen (O2): Electro Chemical Sensor
Measuring Ranges	CO2: 0.00% to 100.0%% O2: 0.000% to 100.0%
Resolution:	CO2: 0.01%, O2: 0.01% above 2.00% O2, 0.001% below 2.000%
Accuracy	4% relative to gas reading.
Repeatability:	1% relative to gas reading.
Response time:	8 seconds to 95% Final Reading, 15 Seconds to 99.5% Final Reading.
Sampling Rate:	4 ml/sec nominal.
Sample Time	Adjustable in 1 second intervals. Factory Default 15 Seconds.
External Gas Contaminate Protection	External water blocking and particle filter (customer accessible) protects pneumatics and optical components from test gas-borne contamination.
Internal Gas Contaminate Protection	Internal water blocking and particle filter (customer inaccessible) protects pneumatics and optical components from test gas-borne contamination.
Start-up	10% Relative 30 seconds from power up.
Warm-up:	Full accuracy in 5 minutes.
Operating Temperature:	+0 to +40 degrees C.
Power: Line Power	110V/220 VAC Universal Wall Supply
Internal Battery	NiMH battery pack, 6-8 hours per charge.
Optional Extended Battery Pack:	Optional extended battery pack provides 16 hours continuous operation on an overnight charge.
Battery Charger/ External Supply:	110 VAC/60 Hz /220 VAC/50 Hz Regulated 'E-Star' compliant.
Weight: Unit Alone	2.5 Lbs.
In Soft Case	3.5 Lbs.
Size: Unit Alone	6 1/4L x 3W x 3 ½H
In Soft Case	8 1/2L x5W x 5H
PC Interface:	Fully Sealed Serial Port, 9600 baud.

7.2 RESET the CO2 andO2 Channel Calibrations to Factory Settings – Use the UP/DOWN Arrows.

If you suspect that the analyzer is operating incorrectly and has been previously mis-calibrated you may RESET previous calibrations and revert to the as-shipped factory calibration constants.

Use this procedure if calibration values have been saved, but you want to restore default starting calibration values.

To do this, simple enter the Calibration Mode as described above and then press the DOWN and UP arrows simultaneously for 1 second.

When 'CAL' disappears from the display, the Calibration Mode has been terminated, and the analyzer calibration constants have been reset to the original (as shipped) factory values.

After the calibration constants have been reset, the analyzer may be operated with factory calibration constants, or may be re-calibrated as described above. The previous calibration values are permanently erased. The factory default calibration values are used and stored in power-safe memory for later use when powered down.

Consumables, Spare Parts, and Accessories

The following spare parts, consumables and accessories can be purchased from Bridge Analyzers.

Consumables

P/N	Part Name	Life
001015	1/16th Thk 'Sticky Nickel' Septum	N/A
108126	Sample Filter – 6-pack	6-12 months
001140	Oxygen Sensor	12-24 months

Spare Parts

P/N	Part Name	Life
000617	Sample Needle	N/A
001370	Sample Line with MLL Fittings	N/A

Accessories/Options

P/N	Part Name	Life
000888	Needle Cleaning Tool	N/A
001246	MAP Analyzer Gas Test Stand	N/A
001400	110/220 VAC Wall Charger / Supply	N/A
001364	High Capacity Battery Pack Option	N/A

The voltage test limit is set high enough to ensure that the analyzer will typically remain functional for 15 to 30 days after low oxygen detector sensitivity is detected, but the operator should make plans to replace the oxygen detector at some time during this period. (The oxygen sensor can be easily replaced in the field.)
New oxygen detectors may be ordered directly from Bridge Analyzers.

4. Taking Gas Measurements

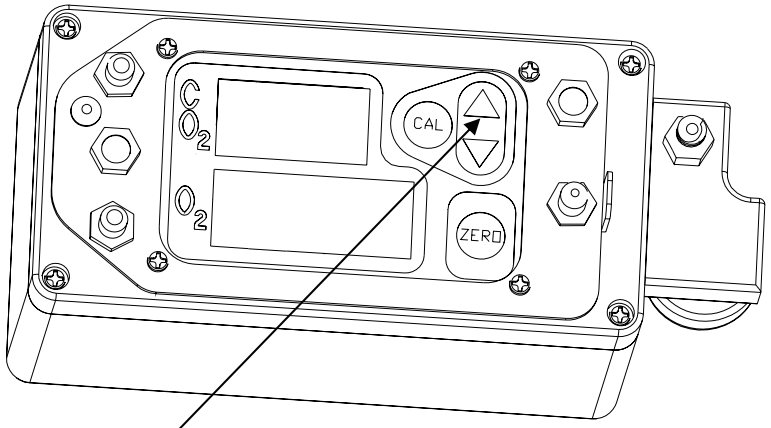
4.1 Continuous Measurement Mode

After the first Zero from power on, the analyzer will automatically be in continuous measure mode. The pump will be on, and gas sample will be continuously drawn through the sample line, measured, and displayed on the analyzer. The analyzer will remain in this mode until the operator selects "Sample Measurement Mode" below.

NOTE: While the continuous sampling mode is the initial measuring mode for the MAP analyzer, and is normally used to verify analyzer function and for calibration where continuous gas flow is valuable, the typical operational use of the analyzer is to measure consecutive product packages for headspace gas content– and the 'sample and hold' test method is more appropriate for this purpose.

4.2 Initiating the Sample and Hold Measurement Mode

The 'Sample and Hold' measurement mode is available to facilitate data recording when testing multiple packages or sites. In this mode, the analyzer draws gas for measurement over the user-specified sample period (900141 product is shipped with the factory default setting of 15 seconds), then turns the pump off and freezes the display. The displayed values are held until the next measurement cycle is executed.



The UP ARROW button puts the analyzer in the Sample and Hold Measurement Mode and initiates the first test cycle. Pressing this button will cause the analyzer to 'count down' the sample time selected, then turn the pump off and freeze the displays.

When the button is pressed for the first time, the analyzer will indicate execution of a sample period by flashing the display every second while taking measurements. At the end of the test interval, it will turn off the pump and freeze the displayed readings as described above.

Consecutive measurements may be taken by pushing the 'UP ARROW' button again. This process continues indefinitely until the analyzer is either powered off or set back into Continuous Measure Mode – done by pressing the DOWN ARROW button.

4.3 Changing the Sample time from the factory default.

The sample time used in the sample measurement mode may be easily adjusted by the operator from the factory default value.

This is done by first putting the analyzer in 'Continuous Measurement Mode'. To put the analyzer in this mode, press the DOWN button instead of the UP button when the display is frozen.

Then pushing the DOWN and UP buttons together will cause the analyzer to display 'SEC' in the upper (CO2) display, and the current sample time in seconds in the lower (O2) display. The sample time may be then increased or decreased in one second increments by using the UP and DOWN arrows. Once the desired sample time is displayed, press the CAL button, and the new value will be stored and used.

The new sample time value is saved in power-safe memory, so it will be used subsequently even if the analyzer is powered down.

5. Periodic Maintenance

5.1 Daily: Recharge the Battery

The battery provided with the analyzer provides 8 hours of standalone operation under fully charged conditions. Battery life is maximized if it is kept fully charged by connecting the wall charger into the unit when it is not being used.

The analyzer is intended to be operated in the industrial environment in 'cordless' mode without the charger plugged in – and powered from its own internal battery pack.

A high capacity battery pack option (P/N 001364) is available from Bridge Analyzers to provide 16 hours cordless operation for this gas analyzer. This is a factory-installed option, and installation requres return of the analyzer to Bridge. Contact Bridge Analzyers, Inc. for pricing and availability information.

Once the readings have stabilized, adjust the analyzer to read the High O2 value contained in the calibration gas using the UP and DOWN arrows.

NOTE: After Hi O2 calibration, subsequent ZERO processes will result in a value different than 20.60% being displayed after subsequent room-air Zeros.

NOTE: Low O2 (Offset) and High O2 (Span) do not interact or effect each other, and one may be performed independently of the other.

6.6 ACCEPT the Gas Channel Calibrations –use CAL/ZERO

To save any calibration values for later use, press both the CAL and ZERO buttons on the analyzer front panel again for 1 second (the same procedure used to enter CAL mode). When numbers appear on all the gas displays, the new calibration values have been accepted and stored for future use in the analyzer, and the analyzer is returned to normal mode. Once the analyzer has been calibrated, the new calibration constants are retained in power-safe memory even during power off conditions, and are activated and used whenever the analyzer is powered up.

7. IF THINGS GO WRONG – OPTIONS FOR ABORTING OR RESETTING CALIBRATION:

7.1 ABORT the CO2 andO2 Channel Calibrations – Use the ZERO Button

If for any reason you feel that the calibration procedure was not performed correctly, you may press the "Zero" button on the analyzer front panel to abort the calibration procedure before changes are saved. (This allows you to ABORT the current calibration process – if you want to reset previous calibrations, see the RESET Calibration procedure.) When 'CAL' disappears from the display, the calibration has been aborted and the analyzer has been returned to normal operating mode.

Any changes to calibration settings made during an aborted calibration mode will not be saved. The analyzer will use the previous calibration constants for present and future operation.

6.2 Pressing CAL Selects the Gas to be Calibrated.

The analyzer automatically selects CO2 as the gas to be calibrated when you enter CAL mode. Pressing the CAL button attain selects High O2, then Low O2, and then back to CO2, and the sequence repeats.

6.3 Calibrate the CO2 Gas Readings.

Using of the UP and DOWN arrows, correct the displayed value to equal the calibration gas cylinder ' tag' value. The next gas can be selected by simply pushing the CAL button when the previous gas is calibrated.

6.4 Low O2 Mode – Adjusting the O2 Offset using calibration gas containing low or no O2.

Often, the low oxygen reading is the most important to the customer – as it is used to test for residual air in the package headspace. The oxygen gas channel is very stable close to zero, but over time it may show a small positive or negative measurement error. The Low O2 Calibration feature allows the user to fine-adjust the analyzer close to 0.000% O2.

Use the CAL button Select LO O2 CAL for oxygen, and allow the display readings to stabilize. (It may take a few minutes for the O2 reading to creep down to zero when moving from room air or the equivalent – be patient to provide enough time for the system to reach a stable zero gas level.) Use the DOWN or UP arrows to make the reading as close to 0.000% as possible.

NOTE: The analyzer is capable of displaying negative gas values to assist the operator in making Low O2 trim adjustments.

6.5 High O2 Mode - Adjusting the High O2 Span on Calibration Gas containing High levels of O2.

The O2 channel is automatically calibrated on ambient O2 during the Zero process. The factory default value shown at the end of the Zero process is 20.60% O2 –to accurately correct for the anticipated 1.5% water vapor dilution in ambient air. High values of O2 are used for some headspace gases, and the analyzer should be recalibrated at high O2 gas levels to increase the high O2 accuracy in this application.

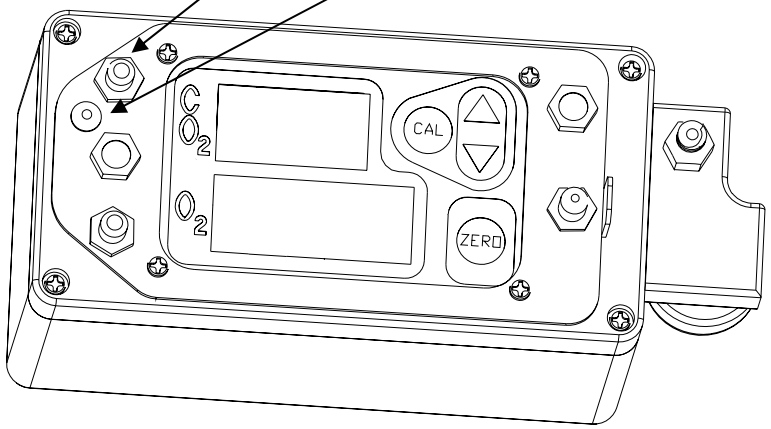
NOTE: This High O2 calibration function is automatically disabled at O2 readings below 2.000% - indicated by flashing the High O2 indication

When calibration gas containing greater than 2.00% O2 is delivered to the analyzer, the High O2 CAL function is enabled, and the O2 reading can be adjusted to the correct value by using the UP and DOWN arrows.

NOTE: The high O2 reading is stabilized by occasionally Zero-ing the analyzer on room air – especially when first going to high O2 levels from very low levels of O2.

Allow the analyzer to stabilize at the new O2 reading, then Zero the analyzer on room air to confirm that it measures both the ambient air and the calibration gas with stability.

To charge the battery, simply plug the yellow cable from wall-mounted 12V supply / charger into the Power Connector at the upper left corner of the analyzer front panel. Plug the wall supply into any 110 VAC power source – and observe the Green Power LED light next to the power connector – showing that external power is supplied.



NOTE: The 12V supply provides two functions – operating the analyzer from a line AC power source, and charging the battery. When the power switch is in the ON position, the analyzer will draw the power it needs from the 12V supply, and any power remaining charges the battery. When the analyzer is powered OFF, all of the wall supply power charges the battery. With the analyzer off, the battery is 80% charged in approximately 4 hours, with a full charge requiring 6 hours.

You may leave the battery charger in the wall outlet and connected to the analyzer and continue to charge the battery while using the analyzer.

NOTE: DANGER OF FIRE OR EXPLOSION

Only use the Bridge Analyzers Inc. wall power pack provided with the Model 900141 analyzer to charge the battery pack. If a different wall charger is used, the battery pack may overheat resulting in a danger of fire or explosion.

5.2 Daily: Inspect the sample filter and needle.

Your Model 900141 Gas Analyzer comes with a 25 mm diameter sample filter which should last approximately 3 months in normal use. The sample filter and the needle should be visually inspected before the analyzer is used. Excessive filter discoloration or indication of restricted flow either through the filter or needle is an indication that the sample filter should be replaced or the needle serviced or replaced.

NOTE: Use only genuine Bridge filters and needles as others may seriously degrade analyzer performance and risk contamination of the analyzer.

5.4 As Required: Verify Accuracy with Cal Gas

The Bridge CO2/CO2 gas analyzer does not need frequent gas calibration for the analyzer to operate within the accuracy specification, as the gas accuracy are generally maintained by the "Zero" procedure as described above. However, particularly if there are any questions about the accuracy of the analyzer during use, the user may verify and readjust the analyzer accuracy with calibration gas containing known quantities of CO2 and O2 at any time.

NOTE: This procedure should be performed only by trained and qualified technical personnel, as it will permanently change the analyzer calibration.

5.3.1 Calibration Overview –CO2 and Hi/Lo O2:

The calibration function is generally used to set the CO2 and Low O2 accuracy of the analyzer to a certified calibration gas mixture, containing gas values similar to those used in the packaging process. CO2 is span calibrated to read the calibration gas accurately, while O2 is offset calibrated.

Also, if the process is intended to replace ambient air with a process gas containing no O2, the calibration gas usually does not contain any O2. The analyzer 'Low O2' calibration is used to set the zero reading of the O2 channel, and is actually an O2 offset adjustment, and is only active with O2 levels less than 2.000%. When the indicated O2 is less than 2.000%, the "Low O2" calibration mode may be used to adjust the O2 reading to agree with the level of O2 in the calibration gas – which is generally 0.000%. This can be done on a gas mix containing CO2, but the presence of CO2 will not have an effect on low O2 measurement, so N2 or some other oxygen free gas mix may be used.

If a small amount of O2 is specified to be present in the calibration gas, the 'Low O2' calibration mode can be used to adjust the analyzer to correctly read the trace O2 value. Conversely - because the O2 sensor is automatically span calibrated to ambient air every time an analyzer Zero is performed, Hi-Span calibration of the O2 sensor is not generally necessary unless the customer wishes to have High O2 (substantially above 20.60%) process gas read correctly. The 'High O2' calibration mode is activated only at O2 levels above 2.000%. When the non-active O2 calibration mode is selected during calibration, it flashes, indicating that it is not usable.

NOTE: Hi Calibrating the O2 channel will cause the analyzer to read other than 20.60% when it is Zeroed on ambient air.

6. Customer Span "Cal" and Cal Verification Procedure

Power up the analyzer and perform scheduled zeros. Allow it to operate normally with the sample pump continuously on for at least 30 minutes.

Note: The gas analyzer should be in the 'continuous measurement mode' during the calibration process so that gas measurement stability may be confirmed.

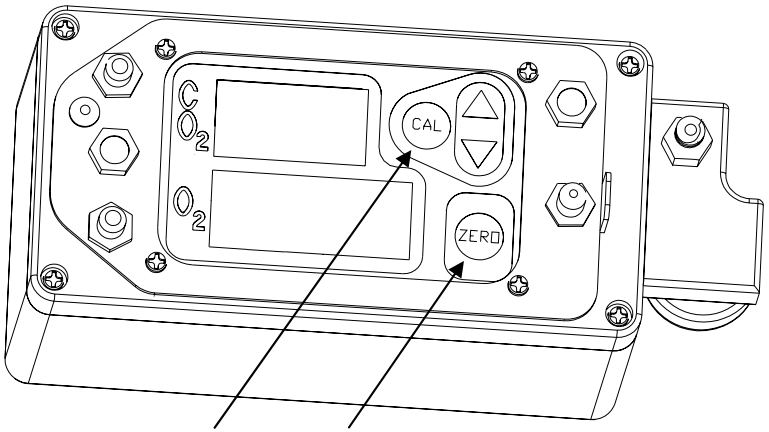
Use calibration gas that can be regulated to produce a low flow sample (around 400 ml/min) that can be drawn by the gas analyzer at ambient pressure. Do not directly connect the calibration gas tank to the analyzer. Instead, allow the analyzer to draw a sample of the gas through a 'Tee' fitting or the equivalent and through a clean needle and filter.

The analyzer draws a sample at approximately 4 ml/sec flow, so very little gas flow is required to ensure correct delivery of calibration gas.

NOTE: Bridge Analyzers Inc. has a MAP Analyzer calibration stand accessory P/N 001246 which has been especially designed to provide the correct flow rate and pressure and interfaces between the certified calibration gas regulator and the gas analyzer to ease the calibration process. Refer to Bridge P/N 001246 for more information.

Verify that the calibration gas measurement is stable before attempting a gas calibration. (Check for leaks, sample dilution, etc.) The service technician should confirm that calibration gas is being delivered to the analyzer correctly before attempting to re-calibrate the analyzer.

6.1 ENTER Calibration Mode - use CAL/ZERO



Press both the "CAL" and "ZERO" buttons **(Press "CAL" first, and hold it down, then press "ZERO)** on the analyzer front panel for 1 second. When "CAL" appears on displays, the analyzer is in the calibration mode. The gas to be calibrated will show numbers on its display, while the other display will show 'CAL'.